

REMARKS

Prior to entry of this amendment, claims 1-29 are currently pending in the subject application. By the instant amendment, claim 1 is amended to correct an error of a clerical/typographical nature. Further, the specification is amended to correct an error of a typographical nature. No new matter is presented by the instant amendment.

Applicants appreciate the Examiner's acknowledgement of applicants' claim for foreign priority and receipt of a certified copy of the priority document.

Claims 1-29 are presented to the Examiner for further prosecution on the merits.

A. Introduction

In the outstanding Office action, the Examiner objected to claims 1-18 because independent claim 1 contained an informality, rejected claims 1, 3-5, 8-9, 11-12, 16-17 and 29 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,380,042 to Huang ("the Huang reference"), and rejected claims 6-7, 10, 13-15, and 18-28 under 35 U.S.C. § 103(a) as being unpatentable over the Huang reference in view of U.S. Patent No. 6,635,536 to Shin et al. ("the Shin et al. reference").

B. Asserted Objection to Claims 1-18

In the outstanding Office action, the Examiner objected to claims 1-18 because independent claim 1 contained an informality. Specifically, the Examiner indicated that line 5 of claim 1 should be amended to include the word "side." By the instant amendment, appropriate correction has been made. Accordingly, reconsideration and withdrawal of the objection to claims 1-18 are respectfully requested.

C. Asserted Anticipation Rejection of Claims 1, 3-5, 8-9, 11-12, 16-17 and 29

In the outstanding Office action, the Examiner rejected claims 1, 3-5, 8-9, 11-12, 16-17 and 29 under 35 U.S.C. § 102(b) as being anticipated by the Huang reference. This rejection is respectfully traversed. The present invention as currently claimed is patentably distinct from the present invention in at least one respect.

In the outstanding Office action, the Examiner asserted:

Huang shows the method as claimed in figures 2a-2l and corresponding text, with conductive structures 40 and protection layers 42, 44 and 48, first dielectric 50, planarization (fig. 2d-2f), second insulating layer 52 and further etching the first and second insulation layers to form the contact hole (fig. 2l).

*Office action of Jan. 22, 2004, at p. 3.*

Applicants respectfully submit that the present invention as currently recited in independent claim 1 is patentably distinct from the Huang reference because the Huang reference fails to disclose or even suggest each and every element of claim 1. Specifically, the Huang reference fails to disclose or even suggest “(e) selectively etching portions of the second insulation film and the first insulation film using a photolithography process to form the self-aligned contact hole exposing a portion of the semiconductor substrate between adjacent conductive structures.” *Claim 1, in part, of Serial No. 10/608,122.*

In the Huang reference, the first insulation film 50 is not etched during the formation of the contact hole. The Huang reference discloses forming a barrier layer 48, which will be used as an etching stop layer in a subsequent CMP process step, over an entire surface of a substrate to fill a gap between adjacent gate structures 36. Then, a first interlayer dielectric (ILD) 50 is formed on the barrier layer 48. Next, a CMP process is performed to level off top surfaces of the first ILD 50 and the barrier layer 48. Subsequently, “an etching back process is performed to

remove a predetermined thickness of the first ILD 50, the barrier layer 48 and the oxide sidewall spacer 44, thus part of the cap layer 42 is exposed and the remaining part of the oxide sidewall spacer 44 still covers the sidewall of the polysilicon gate 40.” *The Huang reference at col. 3, lines 26-31.* As a result of this etching back process, the first insulation layer is entirely removed from between adjacent conductive structures 36. Thus, a contact hole 62 is formed by etching a subsequently formed second insulation layer 56 and the etching stop barrier layer 48 remaining between adjacent conductive structures 36. More particularly, the Huang reference teaches:

Then, as shown in FIG. 2L, the second ILD 56 and the barrier layer 48 positioned under the opening 60 is etched off to expose the N<sup>+</sup>-type ion-doped region 46 between adjacent gate structures 36, resulting in a contact hole 62.

*The Huang reference at col. 3, lines 43-47.*

Accordingly, the Huang reference fails to disclose or even suggest “etching portions of the second insulation film and the first insulation film using a photolithography process to form the self-aligned contact hole exposing a portion of the semiconductor substrate between adjacent conductive structures,” as presently recited in claim 1.

In view of the above distinction between the subject invention as presently claimed and the cited prior art reference, independent claim 1 is believed to be in condition for allowance, and a notice to such effect is respectfully requested.

In addition, because the remaining claims, claims 3-5, 8-9, 11-12, 16-17 and 29, depend, either directly or indirectly, from claim 1, claims 3-5, 8-9, 11-12, 16-17 and 29 are believed to be similarly allowable as depending from an allowable base claim.

Accordingly, favorable reconsideration of claims 1, 3-5, 8-9, 11-12, 16-17 and 29 is respectfully requested.

D. Asserted Obviousness Rejection of Claims 6-7, 10, 13-15, and 18-28

In the outstanding Office action, the Examiner rejected claims 6-7, 10, 13-15, and 18-28 under 35 U.S.C. § 103(a) as being unpatentable over the Huang reference in view of the Shin et al. reference. Although claim 2 is not explicitly rejected in the outstanding Office action, in view of the Examiner's comments presented on page 4 of the outstanding Office action, it appears that the Examiner intended to reject claim 2 under 35 U.S.C. § 103(a) as being unpatentable over the Huang reference in view of the Shin et al. reference. In any event, this rejection is respectfully traversed.

As described above, independent claim 1 is believed to be in condition for allowance, and a notice to such effect is respectfully requested. In addition, because the remaining claims, claims 6-7, 10, 13-15, and 18-28, depend, either directly or indirectly, from claim 1, claims 6-7, 10, 13-15, and 18-28 are believed to be similarly allowable as depending from an allowable base claim.

In presenting the obviousness rejection in the outstanding Office action, the Examiner asserted:

Huang shows the method substantially as claimed and as described in the preceding paragraph.

Huang lacks anticipation only in not teaching that the gate may be composed of silicide; and the various chemical relationships between the first and second insulators including the deposition process.

Shin teaches that the gate may be composed of a silicide.

*Office action of Jan. 22, 2004, at p. 4.*

Based on the above assertions of the combined teachings of the Huang and Shin et al. references, the Examiner concludes:

It would have been obvious to one of ordinary skill in the art to have used a silicide in the gate formation in the method of Huang, with the motivation that the silicide helps to reduce the contact resistance and Shin shows a similar process wherein the gate is also planarized with the silicide layer, so that no processing steps would be compromised if the silicide were used.

It would have been obvious to one of ordinary skill in the art to have optimized the selectivity of the first and second insulating layer with respect to each other and different etch chemistries as well as to have optimized the thicknesses and other variable parameters in the method of Huang, with the motivation that these variables and parameters are dependent upon the device being fabricated.

*Id.*

In view of the Examiner's comments regarding the combination of prior art references and the Examiner's failure to point out with particularity where in the prior art the subject matter of many of the dependent claims may be found, applicants respectfully submit that many of the dependent claims are separately patentable. However, in view of the asserted patentability of independent claim 1, applicants submit that dependent claims 6-7, 10, 13-15, and 18-28 are allowable as depending from an allowable base claim.

Accordingly, favorable reconsideration of claims 6-7, 10, 13-15, and 18-28 is respectfully requested.

E. Conclusion

Since the cited prior art references neither anticipate nor render obvious the subject invention as presently claimed, applicants respectfully submit that claims 1-29 are now in condition for allowance, and notice to that effect is respectfully requested.

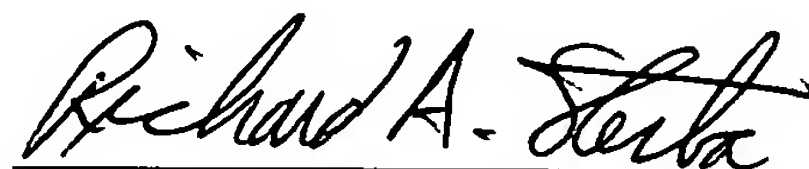
If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

LEE & STERBA, P.C.

Date: April 20, 2004



Eugene M. Lee, Reg. No. 32,039

Richard A. Sterba, Reg. No. 43,162

**LEE & STERBA, P.C.**

1101 WILSON BOULEVARD, SUITE 2000

ARLINGTON, VA 22209

703.525.0978 TEL

703.525.4265 FAX

PETITION and  
DEPOSIT ACCOUNT CHARGE AUTHORIZATION

This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying-papers may also be charged to Deposit Account No. 50-1645.